

## LEADING ARTICLE (INVITED)

# Limiting spread of COVID-19 in an orthopaedic department—a perspective from Spain

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## Abstract

Besides national and international recommendations, orthopaedic departments face significant changes in daily activity and serious issues to maintain their standards in musculoskeletal care during the pandemic Covid-19 crisis that we are facing. This report retrospectively addresses measures that were progressively put in place to modify in a week time the activity of a busy orthopaedic department in a large tertiary university hospital in face of the pandemic. Surgical priorities and surgical outcomes are key aspects to consider. The experience may offer some insight to areas where the spread of the disease may be slower or delayed. Abrupt stop of scheduled surgery and clinics is useful to adapt an orthopaedic department to the overall hospital resource reorganization. Orthopaedic surgeons need to be aware of the risks to patients and personnel in view of underdiagnosed cases, which make pre-operative Covid-19 evaluation mandatory for all surgical cases.

## INTRODUCTION

National and international recommendations are being issued to orient orthopaedic surgeons in their task to take care of musculoskeletal injuries during this pandemic of Covid-19. Of particular interest for each country are those recommendations elaborated by healthcare administrations [1] and scientific societies [2].

Orthopaedic departments need to maintain adequate standards of musculoskeletal care despite the hospital reorganization, with the aims of protecting health and safety of patients and also of healthcare personnel who works in orthopaedic settings. Obviously, national, local and hospital authorities produce rules that should be followed first, and these rules together with scientific recommendations are under constant evolution, due to the dynamics of the pandemic. However, the

adaptation of orthopaedic and other surgical departments is a side issue in many hospitals under the current circumstances. Since our activity may not be seen as a priority, still many issues arise and communication from more affected centres may well benefit the reader with ideas and experiences of interest.

This report retrospectively addresses measures that were progressively put in place to modify in a week time the activity of a busy orthopaedic department in a large tertiary university hospital in face of the pandemic. Underestimating the initial risk may put the healthcare personnel and the patients of the orthopaedic department at a larger secondary risk, as declared by Chinese and Italian hospitals [3, 4]. The experience and discussion may offer some insight to areas where the spread of the disease may be slower or delayed.

Received: March 25, 2020. Accepted: March 29, 2020

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## CASE ANALYSIS

La Paz University Hospital is a large tertiary hospital in Madrid, Spain. Usual activity is considerable. The department organization includes eight units of orthopaedic surgeons taking care of orthopaedic and trauma cases and referrals related to lower limb trauma, knee, hip, foot and ankle, upper limb trauma and elective, spinal trauma and elective, musculoskeletal tumours, and paediatric orthopaedics and trauma. In 2019, a total of 7000 surgical cases were discharged after treatment, 1900 cases were admitted from the emergency department, and 69 500 appointments were seen at the ambulatory clinics. This large hospital was dramatically changed due to the Covid-19 pandemic, and at the time of this analysis, the hospital treats more than 700 Covid-19 (+) admitted patients.

The crisis approach of our orthopaedic department was launched on 9th March 2020, when the number of Covid-19 (+) patients diagnosed in Spain was 1200, with 30 deaths. At that moment, the Madrid region registered 578 diagnosed patients and 17 deaths [5]. The regional authorities (in charge of healthcare and education in the Madrid area) requested from hospitals and universities to establish contingency plans. First measures were to cancel the presence of university students in the hospital, to suspend any in-person congress or meeting activity gathering more than 10 people in the hospital and university settings, and to avoid any travelling or displacement of healthcare personnel outside the hospital. A plan was put in place to progressively decrease the weekly planned scheduled surgical activity, initially suspending any extraordinary surgical activity in scheduled orthopaedic procedures. This was implemented shortening surgical lists and establishing priorities (besides trauma, joint revision surgery, tumour, infections and complications were maintained). By 10th March 2020, 1622 diagnosed cases and 35 deaths were officially recorded in Spain, while in Madrid, the report included 782 cases and 21 deaths [6].

These data were evaluated on 11th March 2020 and it became evident that a progressive decrease of surgical activity may not suffice, as 77 cases in Madrid already required admission in an intensive care unit (ICU). The surgical activity of the orthopaedic department was immediately transformed, from 18 and 17 scheduled surgical cases on the 9th and 10th March 2020, 11 cases on the 11th March 2020, to four cases on the 12th March 2020 (including one hip revision surgery due to recurrent hip dislocation, one knee revision due to chronic infection currently with pyogenic arthritis, one infected total hip tumour prosthesis and one pathological fracture of the femur due to lung carcinoma metastasis). It was agreed that only trauma cases, malignant tumours and severe complications, such as infections, would be in the surgical list.

Reorganization of surgical indications was reconsidered within each specific orthopaedic unit, considering conservative treatment indications if at all possible. The surgical list was to be prepared every morning upon review of previous day surgery and admissions waiting for the surgery. This was done due to, not only the hospital resource reorganization, but also the potential risk for patients that represents scheduled surgery. Even if the hospital surgical environment is safe enough when adequate isolation from Covid-19 (+) surgical theatres and wards is maintained, patients undergoing surgery should be fully aware about post-operative limitations (rehabilitation, wound care and required assistance) and risks, particularly if affected by Covid-19 and requiring isolation that may compromise the post-operative outcome.

To ascertain adequate communication within the department about everyday issues, a video-conferencing system was set up to maintain clinical and management discussions at the end of the day.

Surgical organization of the orthopaedic department was based on the initial classification of the patient requiring surgery. Two circumstances are illustrated: Covid-19 (+) patients, and pre-operative asymptomatic patients for Covid-19.

Surgical theatres to surgically treat Covid-19 (+) patients (compatible symptoms prompted the specific PCR determination of SARS-Cov2 upon admission) were centralized (to address the case with personnel specifically trained for adequate personal protective equipment, under special patient circulation and ward admission rules, and with pre-defined needs of post-operative intensive care). Hip fractures (particularly in aged patients coming from nursing home environments) and polytrauma patients were seen and operated under these special circumstances. Of note, not only outcome based hospital protocols are required for these patients, but careful individual case discussion is required with anaesthesiologists to adequately prioritize these cases (compared to other surgical emergencies) and to prepare the adequate post-operative care.

Surgical theatres for asymptomatic patients (no fever, no symptoms compatible with Covid-19, chest X-ray without radiographic compatible findings and no lymphopenia) were initially maintained and managed from 16th to 23rd March 2020. However, one 59-year-old female patient with severe risk factors (hypertension and diabetes) was admitted to receive surgical treatment for acute ankle fracture infection producing skin dehiscence 3 weeks after surgery. Upon admission, no Covid-19-related symptoms were identified, but 2 days later, the patient presented with dysnea, 80% O<sub>2</sub> saturation, and fever (38.2°C). Chest X-ray confirmed bilateral bronchopneumonia, and PCR for SARS-Cov2 was deemed positive. The patient was admitted into ICU but unfortunately died 5 days upon admission. The patient did not have the chance to undergo surgery, but raised the issue of pre-operatively asymptomatic patients requiring Covid-19 assessment before surgery. Since 23rd March 2020, it was agreed that all cases undergoing surgical treatment in the orthopaedic department should undergo a pre-operative SARS-Cov2 laboratory evaluation by PCR, to clarify the appropriate surgical setting, protect the patient from unidentified risks, protect the surgical personnel and decrease the risk of treatment-related spread of Covid-19 within the surgical setting.

When spread of the disease arrived, further limitations appeared in managing Covid-19 asymptomatic patients. Even in a large hospital with 100 available ICU beds (after post-operative recovery rooms with mechanical ventilation were converted into ICUs), the number of intensive care beds may become insufficient and surgical theatres were converted into intensive care rooms to take advantage of mechanical ventilation, with support of anaesthesiologists. This scenario is to be foreseen, and the availability of surgical theatres to treat Covid-19 asymptomatic (or negative) patients significantly reduced.

## CONCLUSION

Orthopaedic surgery organization and in musculoskeletal care need adaptation in times of the Covid-19 crisis. Abrupt stop of scheduled surgery and clinics is useful to adapt an orthopaedic department to hospital resource reorganization. Orthopaedic

surgeons need to be aware of the risks to patients and personnel in view of underdiagnosed cases, which make mandatory a pre-operative Covid-19 evaluation for all surgical cases.

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